Project Title: Performance Prediction Models August 20, 2004
Project No.: HWY-30604-DT

MEETING AGENDA
August 24, 2004

Meeting Purpose: Project Update and Briefing
Team Members: Dragos Andrei
Harold L. Von Quintus
MDT Staff: Susan Sillick, John Watson, Greg Zeihen, Jody Bachini, Ed Shea

I. Introductions
   a. *Agenda – Suggested Changes or Modifications in Time*

II. Overview and Status of Activities
   a. *Laboratory Testing*
   b. *Field Investigations*
   c. *Database*
   d. *Modeling Calibration-Validation*
   e. *Documentation*

III. Database Overview
   a. *Missing Data Elements – Request LTPP to obtain data*
   b. *Traffic, Material Properties for SPS Projects*

IV. Calibration-Validation Study
   a. *Fatigue Cracking and Rutting*
   b. *Comparison of distress observations and predictions*
   c. *Integration of distress predictions for design and Pavement Management*

V. Demonstration of M-E Pavement Design Guide Software
   a. *Application of Products*

VI. Project Products and Product Submission
   a. *Research Report*
   b. *Calibration Database*
   c. *Interim Task Reports*

VII. What's Left in Project

VIII. Questions and Discussions

Meeting Notes and Action Items

A project meeting update and status report was held on Tuesday, August 24 in the Commission Conference room. The attached agenda lists the items presented and discussed. The meeting started at about 9AM with an overview of the work completed to date.

In summary, a presentation was also provided on the calibration process and the results obtained to date were presented. A demonstration of the new M-E Pavement Design Guide software was provided to identify the complexity, detail of the inputs, and note some of the problems that will likely be encountered by the Department personnel in using the software for selected pavement types. The following is a summary of the items discussed during the project update and status report given to the Montana Department of Transportation on August 24, 2004.

1. There is an FHWA discussion group on the Mechanistic-Empirical Pavement Design Guide. A web site has been created that agencies can go to for asking questions about the new Design Guide. It was suggested that the Department check and use this web site in starting to implement and use the new software.
    a. ***ACTION ITEM:*** ***Dragos will email the link to Greg.***

2. MDT is interested in coordinating with NCAT for future "advanced" asphalt testing (e.g. dynamic modulus and indirect tensile creep compliance testing). MDT will contact NCAT. The person to contact at NCAT is Doug Hanson. It was suggested that MDT request indirect tensile testing to support the thermal cracking part of the new M-E Pavement Design Guide. Much more thermal cracking was predicted than measured for the sites evaluated and analyzed to date. Using actual material properties of the HMA might reduce the bias that has been found to date, when using the level 3 inputs for the thermal cracking predictions.
    a. ***ACTION ITEM:*** ***MDT will contact Doug Hanson at NCAT to determine whether testing can be completed on selected projects form Montana.***

3. A new set of profile data was collected in August 2004.
    a. ***ACTION ITEM:*** ***MDT will send the data to Fugro.***

4. During the presentation, MDT was asked whether those tables with little to no data should be deleted from the calibration database. Some of this missing data in the LTPP database may or may not be obtained with time. After some discussion, it was decided that the tables in the calibration database that contain very little or no data will not be deleted. MDT has hopes that some of the data will be found. The tables will be updated at a later time, when the data becomes available in the LTPP database. As part of the final product, the project team will identify those tables in the calibration database that have been populated with little data. This issue should be addressed near the end of the project.
    a. ***ACTION ITEM:*** ***Include this item in the next project briefing and status update.***

5. As part of the calibration process, the research team will provide not only calibrated coefficients or functions for the performance models included in the M-E Pavement

Design Guide software, but also recommended default values for the design inputs (e.g. default resilient modulus values for level 3 inputs). Some of the global default values included in the Design Guide software may not be appropriate for the materials encountered in Montana. Determination of the recommended default values to be used with the level 3 inputs will be included in the final user's manual being prepared for Montana in implementing the M-E Pavement Design Guide software.

6. MDT noted that there may be an error in the units in one of the slides in comparing the temperatures for the deflection basin comparison study recently completed between the Montana and LTPP units.
    a. ***ACTION ITEM:*** ***Dragos will correct and check the units for temperature in the plots developed for the FWD comparison study.***

7. During the presentation, examples of predicted versus measured rut depths and fatigue cracking were provided primarily for the Montana SPS-1 site. During this discussion on the distress comparisons, it was noted that the HMA might be stripping or have moisture damage. The team noted that they will develop individual site reports that will include inputs, predicted performance and comments specific to each site (e.g. anomalies which may be explained by factors not taken into account in design/analysis) – as an example, stripping or moisture damage of the HMA at the SPS-1 project.
    a. ***ACTION ITEM:*** ***MDT will look for data on stripping on the MT LTPP sites included in the study factorial.***
    b. ***ACTION ITEM:*** ***The research team will prepare the individual site reports for each project in Montana and send them to MDT for review later this year or early next year – prior to the next meeting.***

8. During the presentations, it was emphasized that MDT will need to provide information and suggestions to some of the inputs based on their policies. These areas will be identified and provided to MDT in the future. MDT policy decisions regarding allowable distress and roughness need to be discussed.
    a. ***ACTION ITEM:*** ***The project team will prepare a listing of those items or inputs that will be influenced by policy decisions in MDT to complete the first full calibration.***

9. Design Guide glitches MDT needs to be aware of when using the software:
    - Top-down cracking model not calibrated. Harold recommended waiting until the results of NCHRP 1-42 become available. Right now, all load related cracking is being combined into one value for calibration purposes.
    - In rigid design the program remembers part of the calculations and a new trial design will take less time to run; this is not valid for asphalt pavements
    - Fatigue model for cement/fly-ash treated/stabilized materials does not work, the value of the modulus of rupture cannot be changed. Thus, the fatigue cracking model in the new M-E Pavement Design Guide software will not be calibrated until the error has been fixed. It was suggested that MDT send in a note to NCHRP that it be fixed so that they can continue with their local calibration efforts for the semi-rigid pavements.
    - Cracking is grossly over-predicted in flexible pavements with an asphalt permeable base layer; Harold suggested modeling the layer as an unbound

material with a higher resilient modulus. This issue will be addressed in the user's manual provided to Montana, as a product from this study.

10. To use the simplified Excel spreadsheets in calibration, Harold suggested using EVERSTRESS for the linear elastic layer analysis. The program is available on the Washington DOT web site, for free. EVERSTRESS is the elastic layer program being used to calibrate the simplified performance evaluation-prediction tools that the Department can use for pavement management purposes.

11. It was mentioned that the simplified procedures for pavement design and performance predictions will be provided to MDT. However, no programming is planned for preparing code so that the models can be used in conjunction with MDT's pavement management program for projecting pavement rehabilitation projects. Calibration coefficients will be provided to MDT in using these tools, just as for the new M-E Pavement Design Guide. The same type of equations are being used for both activities.

12. MDT is encouraged to contact Harold, Dragos with any difficulties in using the Design Guide. Gregg Larson in the Illinois ERES office should be contacted for software/computer problems. Ed Harrigan (NCHRP) can also be contacted regarding any difficulties with the Guide. It is recommended that a carbon copy of any correspondence about problems with the software be sent to Dr. Edward Harrigan at NCHRP.

13. MDT advises Fugro to dispose of any material that was already tested and that does not require further testing. All other materials will be stored and possibly sent to NCAT for testing at a later time.

14. We will meet one more time after completion of all calibration activities and deliverables. The time of this meeting will be early next year – possibly during the NHI course on the Introduction to M-E Pavement Design. MDT is planning to host this course early next year. If they decide to host the course, the next meeting could be schedule during that time.